

*J. F. Polk Esq  
to the request of the  
author*

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M98

# ADDRESS

TO

THE AGRICULTURAL SOCIETY,

OF NEW-CASTLE COUNTY,

AT THE

TENTH ANNUAL MEETING,

Assembled at Wilmington, Del., on Sept. 18th, 1845,

*14*  
*9363* DELIVERED AT THE REQUEST OF THE SOCIETY,

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BY JOSEPH E. MUSE, A. M. M. D.

*of Cambridge Mass*

PUBLISHED BY ORDER OF THE SOCIETY.

WILMINGTON, DEL.:

EVANS & VERNON, PRINTERS, CORNER OF MARKET AND THIRD STREETS.

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#### ERRATA.

Page 3, next to the last line in second paragraph the word "palliation," should read "palliative."

Page 5, fourth line in second paragraph the word "entomologo," should read "entomology." Also, on same page second line in fourth paragraph, the word "philosophical," should read "philosophic."

Page 9, the last line of the last paragraph the word "setibus," should read "fetibus."

Page 12, third line in fourth page, there should not be a period after gypsum. The sentence should be continued.

Page 13, fourth line in the last paragraph the word "cases," should read "bases."

Page 14, third line in fourth paragraph, "and have been very successful," should read "I have been very successful."

Page 15, seventh line in fourth paragraph, the word "silicean," should read "siliceous." Same page, the last word in the fourth line of fifth paragraph, the word "then," should read "thaw."





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ADJUTANT

THE ADJUTANT GENERAL'S OFFICE

OF THE ARMY

WASHINGTON

THE ADJUTANT GENERAL'S OFFICE

WASHINGTON, D. C., JANUARY 1, 1900

RECEIVED AT THE OFFICE OF THE ADJUTANT

BY COURIER, JANUARY 1, 1900

FOR THE ADJUTANT GENERAL'S OFFICE

ADJUTANT GENERAL

WASHINGTON, D. C., JANUARY 1, 1900

1900

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## ADDRESS.

*Mr. President and Members of the Agricultural Society of  
New Castle County :*

The position which I have now, the honor to occupy, in compliance with the invitation of your Society, courteously communicated, through your presiding officer, imposes upon me a task, so full of interest, so various, and so comprehensive, that I approach it with diffidence and distrust, indeed, with a consciousness of my inability to do justice to the cause which has been confided to my charge, the great, the all important cause of Agriculture ; one, which has been so ably pleaded in this place, on former and similar occasions, by advocates so competent to perform the duty, that I would encounter the difficulty, only with the knowledge, that I am addressing myself to *congenerous* associates—conspicuous too—for their liberality, as well as their *intelligence and learning*, and who, though they may differ in sentiment, will recognize the unity and honesty of *purpose and motive*, as a palliative for errors, into which I may have fallen in practice, or in theory.

With this reliance, and with this appeal, to the highly intellectual audience, before which I have the honor to appear, I will proceed in the most cursory manner possible, to discuss, in a general and perhaps, irregular method, some of the most interesting principles of the practice and theory of agriculture, that occur to me, as appropriate on this occasion.

The object in view of your Society, the advancement of the agricultural interests, is—"consensu omnium"—paramount to all other human objects, and that the means you have adopted, of associating the *moral*, intellectual and physical forces of your community, are the most potent and effective for its accomplishment, it requires no effort to perceive.

By the mutual interchange, comparison and free communication of the *results, qualities and properties*, that each member may have witnessed, an aggregate knowledge of the true character of things, and of modes is obtained in a few years, which, under an isolated individual exertion of the best faculties, would require a fearful portion of his most active existence.

The period has long since elapsed, when a discourse upon the varied importance and dignity of agriculture, was called for to wipe off the stigma of its low and subordinate condition, to sti-

nulate the farmer to action, to fortify his injured feelings, when necessity may have compelled him to adopt a pursuit against which his pride revolted.

The period has arrived, happily for mankind, when the "Title" of "Farmer," and his "office" confer honor upon the incumbent, upon the highest orders and ranks of mankind, in Europe, America, and in all the civilized regions of the globe.

The politician, the jurist, the physician, the theologian, the man of science, and the man of wealth—these all, worship at the shrine of "Ceres," whose potent charms and benefactions to man, the tasteful, transported classic chants in fluent song—"Cereris sunt omnia munus."

In the employment of agriculture, in its various branches—about fourteen millions, in sixteen of the white population of the United States, are computed to be engaged :—at least two hundred millions of men expend their daily toil, in this occupation :—and a thousand millions, are dependent on it, for their very sustenance ; indeed, the generality of mankind, in all the regions of civilized society, are in the practice of *this profession*, which we are now called upon to *advocate* :—it wants no *advocacy*, but the internal evidences it bears in its fruits, of its own merits, its honor, its dignity, and its utility.

How impressive of these truths, the instance we have here presented before us, in this beautiful Hall, in the evidences of refined taste on the part of the ladies displayed in the rich and fascinating wreathes of flowers and baskets of luscious fruits which Flora and Pomona have consigned to their especial charge, as fit emblems of their native, inherent, innocence—purity and beauty—with the practical testimony of their economy and industry—displayed in the various domestic manufactures, exhibited on the enviable *arena* of friendly and patriotic competition, conferring honor upon their fair authors, and imparting to every generous mind a glow of conscious delight and gratification ; this portion of the scene alone, offers an ample equivalent for the cost and trouble of your demonstration.

How impressive, too, the example before us—in the assemblage of so much talent, energy and enterprise, evinced in the spirit, with which this Institution, "The Agricultural Society of New Castle County," has been founded and sustained, and the animating zeal, with which, this, its tenth anniversary, is so effectively and ardently characterised, in the exhibition of improved breeds of Horses, Cattle, Sheep and Swine, and its various implements for rural and other purposes, highly creditable to their inventors and manufacturers.



But how, and why, has this once reviled vocation, attained its present ascendancy, in the universal assent of civilized man?

The solution of this problem, is to be found in the cultivation of the *science*, or rather, of the *many sciences*, with which it is intimately connected—Chemistry, Physiology, Botany, Mineralogy, Geology, Meteorology, Entomology—these are its *near correlatives*, its cognate branches, without whose assistance invoked, agriculture would never have risen to its present elevated position in the grade of human pursuits.

But, the whole round of the physical sciences, the whole scope of the material world, *organic* and *inorganic*, these all, are its friends and connexions; by propitiating this extensive family, the merited influence is accomplished which elevates agriculture to its true dignity, supreme above all other pursuits, which man, in the fertility of his genius, has ever essayed from the earliest epoch of creation.

The “Science of *Material Bodies*,” or “*Physics*,” was held by the philosophical Aristotle, as *first*, in the order of studies, that of *mind*, emphatically called by him “*Metaphysics*,” as *secondary* to it.

By that first order of human inquiry, cherished as a vital principle, by research and developement of the mysterious and sublime operations of the God of nature, which, half a century ago, where for the most part, concealed from the eye of man, they have been exposed to the view of the present generation, the veil of “*Isis*” has been removed, and the inquisitive mind is rivetted in wonder and amazement upon the *brilliant Panorama*, exhibiting the magnificent theatre of physical creation, heretofore enveloped in utter *impenetrable darkness*.

By this inestimable gift of providence, a new era has arrived, a rich banquet, an intellectual feast, is open to all who have a taste to partake of the luxurious repast, presented before them.

By this Divine favor, all nature is exposed to our view—her stupendous fabric, is divested of its complexity—its members are individualized—its material elements are disclosed—mystery vanishes, and man is enabled by the exercise of his superior faculties—to master all that surrounds him—to apply the machinery, and its parts, in endless variety, for his comfort, convenience and happiness.

Throughout the whole catalogue of human employment, the sciences have contributed to the improvement of the arts; nor, has any one of them, received the fostering influence, more conspicuously, than agriculture; and in the language of the pious

apostrophe of a former disciple, in the great school of nature, inspired with the fervor of his pursuit, we may honestly exclaim "assist us, our Heavenly Father, with the light of that reason, with which thou enlighteneth the world."

Yet, many are to be found, who denounce the lights of science, upon agriculture, under the *odious anathema*, of "Book-learning;" this prejudice arises, from a vain conceit of *self-sufficiency*—originating in *ignorance profound*; the blind man, who has lived in utter darkness is not conscious of the blessings of the solar beams, and Franklin, I think, has somewhere said, the larger the circumference of light, the greater that of the darkness, which surrounds us; it is true of those, on whom, the lights of science have never glimmered—they are not aware of the *fatal darkness*, in which, their faculties are shrouded.

Among the kindred sciences, chemistry, and physiology may be placed, in the first rank of importance: the one teaching the *demands* of the plant; the other, its *supply*; by the one we learn the peculiar organism of the plant, its structure, functional means and purposes, its absorption, circulation secretion, and excretion; by the other, we are instructed, in the properties of its fluids, and its solids—and we deduce therefrom, a knowledge of the elementary materials, essential to its growth and sustenance; one family may need more oxygen—another more hydrogen, or carbon, as acid, or oil may be the chief proximate principle in its product;—one may require a base of soda, another, of potash, lime, or magnesia; which, chemical analysis will indicate; hence, the cultivator is not groping in the dark, he has cast his eyes upon the magnificent theatre, and he feels its luminous influence; he knows the food, which his plants require, he supplies the elements—they digest, and elaborate them, for their growth, and his subsistence.

By geology and mineralogy, he will adapt his crop to his soil; or, he will modify it, in its physical properties, and relations, to suit his purposes: though extremely useful, and formerly considered fundamentally important—yet, under modern science, and culture, the *physical properties* of the soil are considered quite subordinate to its *chemical constitution*.

The justly celebrated Liebig, who, by unparalleled, herculean research, has made a new era, in organic chemistry; and his able successor and expositor, Johnston, following in his mazy, and intricate path, have unsettled former opinions, upon this, as well as upon many other subjects of physical science; they have demonstrated, beyond the power of refutation, the superior im-



portance of an accurate knowledge of the *chemical* constitution of the soil; of that of its *organic* as well as its *inorganic* materials; and they have revealed mysterious nature in many of her most hidden recesses, to the infinite benefit of both animal and vegetable health and life, and to their own immortal honor.

Meteorology—or, that branch of it which treats of the atmosphere and its phenomena as connected with the *weather*, has, in all ages engaged the attention of mankind, for its close alliance with their safety, subsistence and comfort; but, it is only within the short period of general inquiry, that accumulated facts of atmospheric phenomena, have fairly classed it among the sciences.

By the discovery and invention of some necessary instruments, the barometer, thermometer, electrometer and hygrometer, this science has been recently advancing, though slowly; it will probably, at a future period, stand pre-eminent for its vital services to man, in all his varied pursuits; and most especially, to the *Farmer*, and the *Navigator*, whose very subsistence and well-fare are connected with it; and it is the moral duty of all, who possess the means, to promote it.

And last, though not least, for its essential conservatory benefits, is the despised and neglected—"Entomology"—to this, we may apply the classic monition, "*hoc opus, hoc studium, parvi properemus et ampli;*" and we should adopt it, as we would preserve the fruits of our labors.

Almost annually, are *exogenous* insects, flocking upon us; and our *natives* are multiplying in numbers:—from all sections of our country, we hear of *new insects*, the *outposts* of *hostile armies*, threatening invasion; some assailing the roots, some the leaves, and others the grain of our staple crops.

A new variety of the ravenous "*Calandra*," has, the present year, appeared in some of our wheat fields; it subsists on the grain, and was discovered on the head, in active operation, a few weeks before harvest; it differs from the "*Calandra Granaria*," with which the Middle and Southern States, have been familiar, by its attacks upon our *Grain*, when *housed*.

This new insect is smaller than the "*Granaria*"—its form, that of a cone, whose apex is a very short rostrum, its color is a silver gray, with two black spots, on each elytrum:—the "*Granaria*" is a long, slender ellipse, dusky red color and furrowed elytra.

Another new insect has made its appearance in the larva State, this season, singularly, suddenly, and exclusively on two adjoining fields, near Cambridge, in numbers incalculable, literally



covering the lands, and the wheat, and leaving not a *blade* on the stock ; but not attacking the *grain* ; trenches were dug to intercept their passage to the young corn, which, they would, probably have exterminated ; and, an earlier visit, might have been fatal to the wheat crop ; I obtained some of their transformations ; they are a variety of the well known “ Cut Worm,” the “ *Phalena Devastator*”—but larger and of a lighter color.

This subject, gentlemen, “entomology,” is one of deep interest, to the farmer, although despised and neglected, perhaps from the apparent insignificance of its objects—yet, when the magnitude of their operations, is duly appreciated, and the variety, frequency and fatality of their attacks upon our staple, and other crops, they become worthy of our notice, as respects their general and peculiar economy, by which alone, we may entertain a reasonable hope of abating, or preventing their destructive ravages.

To urge the necessity of the various branches of physical science, in connexion with agriculture, before this intelligent audience, would be an act of supererogation :—to prescribe the best modes and measures, in agricultural practice, as I might conceive them, when I behold the surrounding country, as far as the eye can reach, bespeaking a superior grade of practice, under the best modifications of science would be presumptuous—yet, I will briefly notice some mooted points, which relate to *agriculture in general*, and upon which I may have collected unquestionable facts—or, such as *induction* may infallibly settle.

A question has been started upon very eminent authority, of the truth of the doctrine of “Rotation,” and of that of the “supposed necessity of a change of seed.”

One of my predecessors, in this highly honorable station, which I now occupy, the Hon. James M. Garnett, has controverted the truth, or force of this doctrine, in a correspondence, a few years past, with the “Albany Cultivator”—which, lately attracted my attention ; and moreover, these sentiments are, to my knowledge, entertained by *many* intelligent Farmers, and *therefore*, become worthy of a serious notice.

Mr. Garnett adduced as evidence against that doctrine, the universal practice in Accomac and Northampton, Virginia ; where he says “two white crops of grain, corn and oats, constantly follow each other every year, without perceptible deterioration, as the owners all assert ; and without any *return* to the land, except the dead natural growth of the Pea”—he adds—“in several other other parts of Virginia, he has known similar prac-

lice and results—and, indeed the growth of *corn alone, without rest* for twenty years—and the crops *undiminished* ;” “also, of *garden vegetables, the same seed, in the same squares, for eighteen years, unimpaired.*”

But for this able and highly distinguished authority, I would not hold this question worthy of discussion, before this assemblage of skill and science.

The facts stated, are no doubt correct, but circumstances unknown to him, may have existed, to occasion the *paradox*.

A brief view of this subject, may conclude the question and remove the erroneous impression.

Different genera and species of plants, notoriously contain different proximate principles—composed of different elementary materials—or, different proportions of them—supplied by the *soil*—by *putrescent manures*—and by the *atmosphere*—a truth undeniably established by chemical analysis, as well as obvious to all who enjoy the two natural senses of *taste* and *smell*.

The inorganic portion of the supplies, is to be found in the *soil* ; and the soil must contain them in quantity and variety, suited to the wants of the peculiar species of plant ; or, the crop will perish :—when other plants, wanting other elements of nutriment, may find an ample supply, for their growth and maturity.

Though a different base may be substituted, as a vicarious and imperfect agent for the true one, which was absent, yet the plant in such case, will not flourish.

The organic elements are supplied by the putrescent manures and the atmosphere—and come within the scope of the same category, or class of conditions with the inorganic.

But, inasmuch as the *nutriment furnished* and that *appropriated* by the plant, must of necessity, be chemically identical ; and different species contain different principles, it follows that one species continued in the same soil uninterruptedly, would consume and exhaust the peculiar elements of its food, sooner than a series of unlike species requiring different elements, or different proportions of them ; and consequently, that a change, or alternation of species is an essential point of economy, in general culture—by which a “*quasi repose*,” in the interval, is obtained for the recovery of the consumed materials of nutrition before the second series may have commenced :—this was a truth known in the days of the Mantuan Farmer, “*sic quoque mutatis requiescunt setibus arva.*”

For example—one group—the *leguminous*, as “Beans” and

“Peas” require, according to Liebig, but a small portion of the alkalis; the culmiferous, as “wheat” and “oats” require much of the alkalis and phosphates; tobacco consumes much alkali and no phosphates.

From these examples, may be deduced a set of principles, unquestionably sound and in accordance with *rotation* and manifesting its necessity.

The climate too must be consulted in the selection of our crops: for instance, the “Beet” is more profitable in a cold climate; this root requires much *nitrogen*; and as Liebig states—the secretion of sugar will be diminished as the supply of this element may be wanting; and, as the last product of animal decomposition is, in *cold* climates—“Ammonia,” which is rapidly converted into “Nitric Acid,” in the *warmer*, the *alkali* of the plant, will engross the *acid*; and the supply of nitrogen will consequently be deficient, and the “Saccharine” matter therefore not so abundant; hence a cold is more suitable to the Beet, than a warm climate; and as Chaptal has remarked, nitre in such cases, takes the place of sugar; which he says, is experienced in the Southern and warmer parts of France.

Holding in view these *principles*, the cultivator may mark his course in safety and confidence—he will adapt his crops to the climate and to the Chemical and Geological constitution of his soil, and he will distribute the alternations in consistence with these established laws, which the God of Nature has ordained and conferred on him, the faculty of reason to discover and to apply for his comfort and convenience.

The subject of manures is too copious for an ordinary address—yet, the extensive use of lime would seem to claim for it a passing remark.

Like others, I have used it in various modes and quantities—and I have been convinced that it may be *over-used*:—by five hundred bushels to the acre twenty years ago, a plat of six acres of my field was rendered unprofitable for many years, until I had literally buried it with rich earthy and putrescent manures—and it is not now as good as these should have made it.

Dana, in his Manual says “Lime changes vegetable fibre into soluble geine—but applied in excess it forms an insoluble salt;” I have no doubt that in my case, it was in excess.

It is generally admitted, that all the alkaline, saline and other mineral manures, render the humus, or decomposing vegetable materials *soluble*, which are in themselves *insoluble*; the quantity requisite is inconceivably small either for this purpose,



or for consumption by the plant ; yet it is absolutely *essential* for its *chemical action*, as well as for a portion of *physical nutriment*, and in quantity and kind, it must be supplied—either lime, or any other that the special nature of the plant may require ; but analysis of the ashes prove that the demand has been infinitesimally minute.

Practically I have found one hundred bushels of lime sufficient for well manured clay ; and for a light soil—say 85 per cent of silica, and moderately manured, one half that quantity, I hold to be a sufficient dose : and I am satisfied by frequent observation, that the chief rule should be an *equivalent* of the lime, for the *humus* in the soil—and that much more may be *pro tanto*, pernicious.

Lord Kames, in his Gentleman Farmer, says “ an overdose of lime, renders land so hard as to be unfit for vegetation where the land is not well drained—or, where much rain has fallen and lingered on the land after the lime has been applied.” Hence in a large portion of our lands, chiefly on the Atlantic plain—embracing nearly the whole of Delaware and the Eastern section of Maryland, on both sides of the Chesapeake, this disaster might frequently occur.

The soluble effects of lime, in due proportion upon the insoluble humus of the soil, will hasten its *conversion* and *consumption*—and by the aid of *irrigation* will, without extravagant supplies of organic manures soon exhaust the best soils, and render them unproductive.

Hence—irrigation—so highly extolled, I hold to be a measure of equivocal result ; one of its chief effects, is a rapid decomposition of the vegetable substances in the soil, by means of the oxygen, held in solution by the water—and their conversion into humus ; much of this humus is *insoluble*—and, by lime is rendered *soluble*—it follows then, a priori, that *irrigation*, freely practiced and assisted by the use of *lime*, would tend rapidly to the exhaustion of our soil.

When the Nile and the Ganges and some other rivers may perform this operation, without injury, or, indeed, with much benefit, nature has, with her known consistence, and infallible wisdom, loaded them with *putrescence* and with the *gaseous products*, nitrogen, oxygen and carbonic acid, in quantities unusual in other rivers, or running waters ; these compensate the rapid consumption ; but irrigating waters, in general, do not contain them.

Waters, holding in solution mineral substances, may be useful

*quoad hoc* ; yet, in any case, the water too long retained, will substitute a coarse, aquatic plant, for a more valuable species, and this tendency produced, will be difficult to be subdued.

To prevent, or remove this disposition to the coarse grasses, arising from an excessive retention of water, I have found *underdrains* more effectual than the "*sub-soil*" plough.

When the soil is super-imposed on a stratum of pan, or bed of impervious clay, the water necessarily accumulates upon the bed ; and sub-soiling may afford a partial and temporary relief ; but the loosened clay soon regains its natural position and density and the good effect ceases ; but, well constructed "*underdrains*," sunk deep into the bed, are very durable, and afford a free and capacious vent, eliciting, on a well known law of "*hydraulics*," the passage of the water, by the force of its draft, exerted upon the capillaries of the incumbent soil : My own comparative and practical results for several years, confirm these suggestions.

Returning from my digression, to *Manures*, Ashes are indispensable, where wheat, tobacco, or the grasses are in frequent cultivation, and especially, when these crops have been *forced* as, by the use of gypsum ; these plants require a large supply of alkalis, and the *greater, more frequent* and more *abundant* their growth, then the *greater* the *consumption* and *exhaustion* of these essential substances ; and the greater the necessity of *ashes*, which contain them.

An instance in point, is occurring near Annapolis, on South and West Rivers, where the lands have been rendered very productive, by gypsum. Of wheat, tobacco and the grasses, all great consumers of the alkalis ; putrescent manures, were considered by many unnecessary, as I have been informed and not applied ; the owners are now startled with the fact, that gypsum is losing its magic powers ; Gypsum is a mere condiment ; it may season, or it may concoct the food, and whet the appetite, but it can never supply the materials of *nutrition*, on the contrary, it will *lavish* and *consume* them.

Many new nostrums have been recently offered, as *manures*, or *substitutes* ; *steeps*, and other *concentrated liquors* and *powders*, of various and possibly, precarious repute.

With these I have not been so fortunate, in my few experiments as some others, who have reported their results ; the unusual drouth may have operated to defeat me.

With Guano, on corn, I have had the best results, from the solution around the plant ; on wheat, I will give it a fair and full trial the approaching season ; it is unquestionably a rich manure ;

but the small quantity prescribed, will not, I fear, be competent to verify the promise, and the increase of its product, will not, I think, measure with the cost of a sufficient dose : its mixture with ashes or lime, as recommended by many of its advocates and venders, is wholly unphilosophic and unchemical ; by either substance, its chief ingredient of fertility, ammonia, will be *liberated* and *lost* : by mixture with sulphate of iron, which I occasionally practised, this fertilizing substance is preserved, and its *deadly odor* is removed.

In the form of "*steeps*," to afford nutriment, or to prevent, or destroy insects, the Guano, the Hauterive solution and others have failed to perform *either purpose* ; and I may, with truth, echo the sentiment of the classic farmer "*semina vidi equidem multos medicare serentes, et nitro prius et nigra perfundere amurea*" and with the like result "*vidi lecta diu.*"

The famed Poudrette will realize its high repute : my experiments have been with about 100 bushels of this article, which I had prepared with the sulphate of iron, by the method of "Dumas," the great philosophic investigator of the marvellous works of Providence ; with two spoons full to the hill of tobacco, I had astonishing effects, and am encouraged to manufacture it, on a larger scale, the ensuing year.

By a solution of this metallic salt, the sulphate of iron, the offensive odor of all decomposing organic bodies is immediately removed, under chemical laws, which may be unknown to many ; and being useful to all, in a view to *pathology*, as well as *agriculture*, I will offer a few remarks on the subject.

This substance, the "Sulphate of Iron," is preferable to the sulphate of Lime, or the Chloride of Lime, as a "*disinfecter* ;" the sulphate of Lime loses its force of the double affinity, or its tendency to exchange *gases* with the carbonate of ammonia, when it has become partially decomposed ; and, necessarily it then ceases to perform the office of disinfection and the chloride of lime so extensively used to correct the miasmatic and contagious air of hospitals, sewers and other filthy places, is extremely injurious to health ; its chief agency, must be, through its "Chlorine" liberated by the carbonic acid, always present in such cases—uniting with its lime—and if there be more than an equivalent of the chlorine, for the ammoniacal product of the putrescent materials—its effects will be pernicious ; Liebig has said "Chlorine destroys ammonia, and organic bodies, with much facility—but it exerts such an injurious influence upon the lungs, that it should never be used in places in which men breathe."



The "Metallic Salt," is liable to no such objection; the gasses, escaping from the putrescent bodies, are the "ammonical" with "sulphur," "phosphorus," and "hydrogen," and the carbonic; which latter does not contribute to the odor; by the influence of their chemical relations, the sulphuric acid of the salt unites with the ammoniacal gas and renders it fixed and *inodorous*:—the sulphur, phosphorous and hydrogen unite with the iron of the salt, and become, also *inodorous*, thus converting by a cheap and easy process offensive, deleterious bodies into unoffending and valuable materials, for the health, and subsistence of animal life.

A striking instance is here presented, in the phenomena developed, in this small department of the great laboratory of nature—of the divine attributes and plans of the Supreme Creator—and of the infinite wisdom and contrivance, with which, the minutest parts, are adapted to the perfection of the great fabric of the universe.

We behold, in the instance before us, organic bodies having performed their part, in the grave drama of life—decomposing—and *returning* to the common air, from whence they came, the elements with which it had furnished them, for a momentary existence; and these elements, again, in turn collected and elaborated through the *vegetable machinery*—again modified for *animal* uses—and by the *animal* received, refined and appropriated, to sustain, for a fleeting moment, the very *highest grade of organic life and being*—which is, again resolved into its first elements, and changed into new forms, for a new series of physical *action and re-action*—making, by means of its *chemical energies*, an *endless cycle of organic creation and dissolution*; and thus demonstrating the marvellous truth, that *man* is but an *atmospheric compound*—*animated through Divine Agency*—by *physical and moral light*:—"O Jehovah; quam ampla, et miranda sunt tua opera."

With "*Electricity*," as an excitant to vegetation, I have made some experiments, "*atmospheric*," and "*terrestrial*;" with the former, and have been very successful; with the latter, not so; it would avail nothing, to recite them.

I have had another, on hand, by which, I may, possibly, combine the powers of the thermo—and hydro electric currents; no satisfactory results, are, as yet, obtained.

For a supply of manures, for many years, my chief reliance has been a compost, based on a stratum of swamp muck, covering the farm yard, and improved by suggestions, in Professor Jack-

son's "Geological Report;" on the stratum is thrown, some hydrate of lime—next, a layer of stable manure and animal and vegetable refuse; alternately, and forking up the mass and sprinkling the surface, when forked, with a solution of sulphate of iron.

The rationale of this compost, is obvious:—By the bed of swamp muck, I obtain a large mass of fine insoluble humus—by the hydrate of lime, a solution of it is accomplished—the gaseous ammonia liberated from the stable, and other vegetable and animal materials, by the action of the lime, is, partly fixed by the sulphate of iron, and the residue, combines with the humus of the muck, and thus the nitrogen, the most essential principle of all manures, is well preserved and economized; and the other principles attained for small costs and trouble.

The subject of crops is necessarily, one of the first importance; in their selection, fitness of climate, soil, rotation, and market, are all essential conditions.

Plants, as well as animals, by a sanitary impulse, impressed by nature seek a suitable locality for their well being; by this impulse, different species seek not only different "HABITATIONS" in reference to climate—but, also, different "STATIONS" or PECULIAR localities. One group will flourish in a humid, another, in an acid soil. One, in a river, or marsh, another, on the mountain top, one, in a silicean, another, in an argillaceous soil, and all in infinite variety; in the selection of which, *INSTINCT*, more infallible than *reason*, will be their unerring guide; nor can the *will*, or, the *hand* of man control it.

Our climate, within a few years, has materially altered—and facts are frequently presented, that lead to the belief, that our "wheat" is under the impulsive force of *migration*, by means of this occurrence.

Our seasons are considerably changed, in point of time; the winter commences later, and it bears the character of "excessive," with its technical import of variable and frequent alternations of temperature: by the sudden changes of frost, and ~~then~~ *then*, our wheat, and other winter crops are, often injured; by the frequent expansion and contraction of the soil, the roots are thrown out of their bed, and exposed to the fatal action of the weather; the heat of summer finishes the work of destruction—the spring season having vanished, for several years, with its genial showers, giving vital energy to all organized beings; for many months follow alternate drouth and flood; a distribution of rain, unequal and local, and as fatal to vegetation in the one case as in the other;

and, the *present year*, our "corn" crops, realize this sad picture but I commend to others, and myself, resort to my favorite maxim—"ne cede mialis, sed contra audantior ito."

I have made many and expensive trials, to discover some new and better crops, but the fates have not favored my designs :—

My Cotton crops were successful, for two seasons, the next two proved them to be as precarious as our own ; my Palma Christi, flourished well, but could not be harvested without much labor and loss, from its unequal ripening. The "Shipping Bean" so highly recommended, did not meet my views ; and my experiments with the "Madder" disappointed me ; indeed, *this* crop has been relinquished in the South and West, where it has been largely cultivated.

My experiments in the growth of "Silk" (not the "tree speculation," which I always viewed as a bubble) were made under great advantages, and in much confidence, *on authority* :—Hence I bought every variety of "Reel," "Wheel" and "Shelf," which might make it perfect ; fifty thousand worms were *safely shelved*, for the first year, and sportsman like, I doubled the hazard, upon the loss, annually, until I had reached nearly a million of worms, on the fourth year :—when I pronounced a final "*anathema abjuratory*"—against the whole concern—worms—authorities—and implements.

One other crop merits attention, one, whose "habitation"—"station"—and "market," all recommend it :—one that will give strength and activity to our teams and profusion to our dairies—and will adorn the hospitable board with the choicest viands. I mean the "*grasses* ;"—for the favorable conditions of this crop, and its successful adoption in the County of New Castle, no stronger evidences can be offered ; than those—its enumerated good fruits, so copiously presented, and enjoyed, on this Festal Anniversary.

With the growth, and manufacture of Spanish Tobacco—in a seven years experiment, I have found it a profitable crop—producing some years, on a few acres, a hundred thousand Segars, manufactured on my Farm, and commanding about fifteen dollars per thousand.

The "Spanish" Leaf, being much smaller than the "Common," six hundred pounds is considered a fair average, per acre—which, allowing the usual rate of fifteen pounds, for a thousand Segars, will make forty thousand Segars—and at the price named, they will amount to six hundred dollars ;—from which deduct the cost of manufacture—cultivation—boxing, and



other expenses—and three hundred dollars will be left, for the nett profits of one acre.

Whatever be the kind of crop, the scale, on which it is attempted, should be small, in the ratio of our means ; I have on a similar occasion, dwelt on this cardinal point of economy, in Maryland—where the fault of *over-cultivation* is prevalent ;—the cost and labor of cultivating one acre of poor land, yielding five bushels of wheat, is equal, it will be admitted, to that of a rich acre, yielding twenty bushels ;—but the *rich*, yielding four times as much as the *poor*, the costs in relation to the crops produced, will be as four to one, in favor of the rich acre ; and the product, in the one case, being five bushels—say at one dollar per bushel, is five dollars—less four dollars for cost—equal one dollar *profit*.

In the rich acre, producing twenty bushels it is twenty dollars—less four for cost—equal sixteen dollars *profit*, or, about sixteen hundred per cent. in favor of the rich acre.

Finally—gentlemen—as a co-adjutor in the spacious field of agriculture—in that field, where the intricate, and sublime works of nature, require to be studied, and investigated—and where our labors, though often frustrated, by her inscrutable laws, are yet requited by moral—intellectual—and corporeal blessings—as an humble co-adjutor, I repeat, I offer the most cordial gratulations—on the many evidences presented here—before the eyes of the merest stranger—of the auspicious zeal—enterprise and perseverance, with which this tenth anniversary of the “Agri-cultural Society of New Castle County,” has been so forcibly illustrated :—and with my best wishes, for their continued prosperity, individually, and corporately, I conclude my prolonged address.











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